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T H E

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HINTS ON HERBORIZING.

BY A. H. CURTISS.



As there are many persons, especially in the country, who desire to acquire a scientific knowledge of the world of vegetation which surrounds them, but who, for the lack of competent instructors, do not know *how to commence*, the following brief directions, offered at the commencement of the floral season, will probably prove serviceable to many readers of the NATURALIST, and may perhaps afford some new ideas to experienced botanists. Any one having a capacity for study may learn the name and natural relationship of any flowering plant by an intelligent use of a good descriptive work on botany.—first reading, as a necessary drudgery, an elementary treatise on the structure of plants. But no one can be a good botanist without a good herbarium, which is composed of dried specimens of species and their various forms arranged in systematic order and accurately labelled. The formation of a good herbarium is no simple task, and desultory, unguided efforts will surely be attended with much loss of time and many sources of discouragement.

Scientific characters are taken from the fruit and leaves as well as from the flowers, and often the roots are very important; therefore, a mere sprig of flowers does not constitute a “botanical specimen.” A plant not over three or four feet high should generally be preserved entire, doubling it upon itself once or twice if too long for the herbarium sheet—the most approved size of which is eleven and a half by sixteen and a half inches—

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of very large herbs, the upper portion and a lower leaf must suffice, and of shrubs and trees a branchlet. Specimens of most herbs may contain both flowers and fruit, but of most shrubs and trees the flowers are to be collected early in the season and the fruit with mature leaves later. Sedges should be collected only in mature fruit.

Specimens are usually brought home either loose in a tight tin box or pressed flat in folded sheets of thin paper carried in a stout portfolio : but good specimens are more easily prepared by using a portable press. This consists of two light but strong boards half an inch thick, fifteen and a half inches long, and ten and a half inches wide ; this size will prevent specimens from being made too large or unnecessarily small. Between these place a pile of driers of the same length and width, each consisting of a sheet of rag paper folded in quarto with a folded sheet of tea paper inside to hold the specimens till dry. Straw paper, however thin, should never be used. The whole is to be bound together with a stout strap, and may have an oil-cloth cover. Arrange each specimen naturally, showing both sides of leaves and flowers, and fold down the upper half of the drier carefully upon it, seeing that the leaves, etc., lie smoothly ; carelessness in preparing a specimen is unpardonable, for it may be destined to be preserved for centuries. Next morning transfer the sheets of specimens to the house press, for which there should be provided a great number of driers, about twelve by eighteen inches in size. The best kind of drying paper may not easily be obtained, but newspapers answer very well. The press should be divided by boards into sections, ticketing each to show whether it is to be changed the next day or the day after, and assort the specimens accordingly. Do not take out the specimens till perfectly dry ; and, if plenty of driers are at hand, transfer the specimens when nearly dry to another press, and let them remain a week or two ; most grasses and sedges, and many other plants, may be transferred to this at the first change. Build up the piles compactly, with thick strips around the edges, so that all may receive uniform pressure from the fifty to seventy-five pounds of weights to be placed on top. Succulent plants may be dried quickly by placing them in a separate press near a stove ; the heat may be so great that a thick specimen at top will dry in a day, but care should be taken to remove them as soon as dry. Besides Monocotyledons and Saxi-

frageæ this treatment should only be applied to plants that incline to mould or fall to pieces (Coniferæ are not benefited by it). To dry the damp driers effectually without spreading them all over the room, cut a hole in one end of each and string them on a stout wire and suspend this on hooks set in the under-side of a shelf. Pieces of stiff paper with a slit in the middle are useful for confining specimens of sedges, etc., where bent, and folded pieces of oiled paper for adhesive flowers, etc.; also rings of cotton for thick heads of ligulate Compositæ. The color of plants is best preserved by rapid drying, but not much attention should be paid to this point, as they will fade in a few years. If such plants as the purple Arisæma and Symplocarpus or an orange Lilium be dried in a few minutes by *ironing* them in their driers, they will look when mounted like paintings.

Specimens may be mounted for the herbarium on sized paper with glue, or on unsized paper with touches of poisoned paste and strips of gummed paper. Never mount a small specimen on the centre of a sheet, nor any specimen without first poisoning it, which is done by washing with an alcoholic solution of corrosive sublimate just weak enough not to show. A pile of duplicates, if infested with insects, should be inclosed for a while in a close vessel with an ounce or two of chloroform or cyanide of potassium. A few grains of the latter introduced into a case of entomological specimens will quickly destroy all intruders. It is best to keep each genus in a manilla cover and these in piles on the shelves of a cabinet.

The earliest flowering plants being on the whole most difficult, the beginner will meet with many discouragements at first; but every step will add to his strength. Any locality will afford from five hundred to eight hundred species of flowering plants, and, in determining so large a number, mistakes are inevitable; therefore, it is well to send a set of specimens, numbered to correspond with one retained, to some person having a good herbarium, who will doubtless be willing to examine and name them in return for the specimens. The same may be done if the determination of names is not attempted at all, but great care should be taken to see that the two sets exactly correspond, for there is great danger of confounding closely related species, as also of mistaking marked forms for different species.

The plants of other sections may be easily obtained by ex-

changing with other collectors. A person before commencing this system should procure the "Naturalists' Directory" and the "Catalogue of Plants" from the Naturalists' Agency at Salem, to which it would be safest to apply for the best works to be studied.

If one expects to collect year after year for exchange, it is very advantageous to keep a record of the time when the best specimens of each species are to be obtained, which will be found to be an invaluable aid in following seasons. System in scientific work is of the greatest importance, and with this and patient perseverance and economy of time, great results may be accomplished.

USE OF THE RATTLES OF THE RATTLESNAKE.

BY J. G. HENDERSON.

It seems that the singular structure from which the subject of these notes derives its name, was intended as a special stumbling block in the path of antidarwinists, or to intensify the "struggle for existence" which the Darwinian theory, like all other theories must undergo.

In most notices I have seen of the rattles of the rattlesnake, they have been mentioned as though they were of no advantage to the possessor, and that natural selection would never produce them but on the contrary would weed them out, if that theory were correct. It seems to me that the whole trouble in the matter arises from the assumption that the sound of the rattles, as a war-cry, is a disadvantage to the reptile, by calling the attention of its enemies to it and thus inviting its own destruction, and that consequently the only way to reconcile the existence of the rattles with the theory of Darwin, is to show that there is some other use made of them and that in striking the balance between the profit and loss sides of the ledger, the line falls on the side of the former and for that reason natural selection produced and retains the rattles. If I understand him rightly, this is the view of the matter taken by Prof. N. S. Shaler in his paper in the January NATURALIST. He says that for some years he has "been teaching that the tail appendage of the rattlesnake was not to be explained